# Linear Thinking vs. Exponential Development

We learn to think linearly from childhood on, and in everyday life, exponential developments are rather alien to us. It is therefore difficult for us to really understand and assess them. Pascal explains what this means with some impressive examples.

## Learning contents

- **Exponentiality cannot be grasped intuitively**
- **Exponential technologies are disappointing at the beginning**

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Albert Allen Bartlett, who taught these exponential trends at Boulder University, once said:

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"The greatest shortcoming of the human race is our inability to understand the exponential function."

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What Allen meant with this is that the way we as humans perceive the world,

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the way we see it is linearly, buy and large.

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You know, the day has 24 hours, the seasons come and go.

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It's very easy for us to understand linear trends.

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And in a lot of ways, it was really important for our survival as a species back in the day,

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because we needed to understand these trends, these ideas around us.

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We're really not well conditioned understanding exponential trends or just exponential phenomenas.

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Let me give you a simple self-experiment, and I want you to do this with me.

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So, imagine you take 30 linear steps.

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30 steps, one after the other.

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You know exactly how far you get, right?

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It's 30 meters, or 30 yards, and if I were to come with you and go onto the parking lot,

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and we'd look ad it, you would know exactly how far it is.

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Now, let's go into the world of exponentials.

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We talked about this: computers, DNA, solar.

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That's all exponential.

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Imagine you take 30 exponential steps, each step twice as far as your last.

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So you go from one to two to four to eight to sixteen.

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You do this 30 times.

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How far do you get?

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And please don't pull out your calculator, I know you can do that.

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It's a billion meters.

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It's two to the power of 29, it's a billion meters.

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Well, here is the really interesting question:

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How far is a billion meters, how far does it feel?

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And I'm pretty sure you will not know this.

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Most people will not get it.

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It's 25 times around planet earth.

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I think that demonstrates two important concepts.

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The first is: if you have something which is linear, in 30 steps it goes to 30,

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if it's exponential, it goes to a billion.

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And much more important: you as a human can not feel it.

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So we need to force ourselves to understand exponentials.

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There's an interesting thing which happens when you put these curves together,

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the exponential nature of technology and our linear thinking.

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When you put them together there's three parts in these curves.

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Part number one which we call "Disappointment":

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You want technology to be better, in the beginning, than it really is.

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And if you've ever seen Google Glass - it's a perfect example.

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Google Glass, and let me tell you as someone,

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who wore Google Glass for three months on the Google campus,

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it was too expensive, the battery life was terrible, the features were mediocre,

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and you looked like an idiot wearing it.

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So you're disappointed, rightfully so, it's not good!

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But then technology gets better and better and better and moves forward,

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and you get to this magic moment when the lines are crossing,

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which we call the "iPhone Moment".

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It's the moment Steve Jobs got on stage and showed you the iPhone,

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and for the first time you understand that a phone isn't a phone anymore,

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a phone is a computer and it doesn't have buttons, it has glass.

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And then you get to "Chaos and Amazement".

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That's the world where you can't keep up with the changes were seeing in the world.

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Let me tell you an interesting story I had about "Chaos and Amazement" and the "iPhone Moment".

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I was at the iPhone press conference and next to me was this gentlemen,

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beautifully dressed, he pulls out, no offense,

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but pulls out his brand new Nokia phone - brand new.

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And Steve Jobs does his thing and he looks at his phone and says, and pardon my language:

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"Sh*t".

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Cause he understood that the world had changed.

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Thinking linearly is truly like: you're doomed.

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So you have to force yourself to think in exponentials.

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And here's your most important insight in this:

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The moment a technology becomes digitized or even digitally enabled,

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it moves from a linear to an exponential curve.

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And those are the biggest business opportunities we see, bar none.

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That's the reason why Silicon Valley investors are currently investing

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into two core technologies or industries: One is healthcare.

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A trillion dollar industry worldwide which is currently massively being digitized.

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And the second one is, and this might come as a surprise,

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something we call "AgTech", or Agricultural Technology.

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Simple: farming!

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Trillion dollar industry currently massively being disrupted by becoming digitized.

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So you have to become an exponential thinker.

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